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| 09/734,950 | 12/11/2000 | Cecilia Y. Mak | 005621 | 3444 |

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| EXAMINER | |
|---|---|
| TRAN, BINH X | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1765 | |

DATE MAILED: 12/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/734,950 | MAK ET AL. | |
| | Examiner | Art Unit | |
| | Binh X Tran | 1765 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *22 September 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *71-87 and 98-113* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *71-87 and 98-113* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

## DETAILED ACTION

### *Claim Interpretations*

1. The examiner interprets the term "system" (in claim 87) means a group of interacting, interrelated, or interdependent elements forming a complex whole. Since the term "system" includes interacting, interrelated or interdependent elements for a complex whole, the examiner reserves the right to interprets that the depositing step and the curing step of Xu is performed under the same system (i.e. Xu's depositing and curing step are performed in a group under the group of interacting, interrelated, or interdependent elements forming a complex whole).

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 106-112 are rejected under 35 U.S.C. 102(e) as being anticipated by Xu et al. (US 6,306,563).

Respect to claims 106, Xu discloses a method comprising: depositing one or more of the lower cladding (6), core layer, upper cladding layer and heating treating via radiation one or more of the lower cladding, the core and the upper cladding in situ following the deposition thereof (col. 8 lines 7-15, col. 11 line 67 to col. 12 line 10). Respect to claim 107, Xu discloses depositing the core layer and forming a light propagating channels in the core. Respect to claims 108-112, Xu discloses to cure (read "heat treated") the lower cladding, the core and the upper cladding in situ following the deposition thereof (col. 8 lines 7-15, col. 11 line 67 to col. 12 line 10).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 71-72, 74, 87, 98 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu.

Respect to claims 71, 98 Xu discloses all the step of positioning the panel, forming the lower cladding, densifying the lower cladding, forming the core layer and forming the upper cladding. Claims 71, 98 differ from Xu by further discloses three different chambers for processing all of the claimed steps. It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Xu by using three different chamber because it would reduce processing time without cleaning the chambers for cross contamination in each step. Respect to claim 72, Xu discloses the step of curing the upper cladding following the deposition.

Claim 74 differs from Xu by the specific utilization percentage value. Utilization percentage is result effective variable. The result effective variable is commonly determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one having ordinary skill in the art, at the time of invention, to perform routine experiment to obtain optimal values as an expected result.
Respect to claim 87, Xu teaches depositing and curing a lower cladding layer in his invention. The examiner, therefore, will interpret that the depositing and curing steps are performed on the same system (See "Claim Interpretation" section for further detail).

8. Claims 84-86, 99-102 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu in view of Nishimoto (US 5,408,569).

Respect to claim 84 Nishimoto discloses the lower cladding is made of undoped $SiO_2$ (col. 3 lines 28-30; read on USG or undoped silica). Respect to claim 86 Nishimoto discloses the upper cladding comprises BPSG (col. 3 lines 30-35). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Xu in view of Nishimoto by using undoped silica for the lower cladding and/or BPSG for upper cladding because it is easy and relative cheap to prepare.

Respect to claim 85 Xu fails to disclose the core material comprises $GeO_2$. However, Xu discloses the core material comprises $SiO_2$ (col. 12 lines 39-41). In an optical waveguide method, Nishimoto discloses the core material comprise $SiO_2$ doped with $GeO_2$ (col. 3 lines 24-26). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Xu in view of Nishimoto by using $GeO_2$ because it will enhance the refractive index.

Respect to claim 99, Nishimoto teaches the lower cladding comprise undoped $SiO_2$ (USG) and the core comprise PSG (col. 3 lines 27-30 and lines 58-63). Respect to claim 100, Nishimoto teaches a rapid thermal process for a single substrate.

Claim 101 differs from the cited prior arts by the specific temperature and annealing time. Temperature and annealing time are result effective variables. The result effective variables are commonly determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one having ordinary

skill in the art, at the time of invention, to perform routine experiment to obtain optimal temperature and time as an expected result.

Respect to claims 102, Xu teaches performing a photolithograpy step on the substrate to define the core pattern (8) then depositing an upper cladding on the core pattern ant then curing (perform densification) in a curing chamber (col. 11 lines 5-30, Fig 18-Fig 22).

9. Claims 73, 75-81, 83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu in view of Veligdan et al. (US 6,222,971).

9b. Claims 103-105 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu and Nishimoto in view of Veligdan et al. (US 6,222,971).

Respect to claims 73, Veligdan teaches a glass panel define one or more dice having ore or more optical device (such as optical waveguide) having a dimension of 133 cm x 100 cm. It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Xu in view of Veligdan by having a glass panel define the one or more dice and the dice have optical device it will help us to create a multi-clad display.

Claims 75, 103 differs from Xu by the specific area of the optical device. Veligdan discloses the substrate/panel area is a result effective variable base on height and width. Veligdan further discloses the height of 100 cm and width of 133 cm (area = 100 x 133 = 13, 300 $cm^2$; col. 3 lines 25-45, read on applicant's range). The result effective variable is commonly determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of

ordinary skill in the art. Hence, it would have been obvious to one having ordinary skill in the art, at the time of invention to perform routine experiment to obtain optimal area as an expected result.

Respect to claim 76, Veligdan teaches the dice comprise optical device (waveguide) having the shape similar to the panel. Since the dice and the substrate have the similar shape, they should have the same form factor (claim 78).

Respect to claim 77, Xu teaches the deposition step requires a curing step (i.e., densitification). It would have been obvious to one having ordinary skill in the art, at the time of invention, to deposit and curing in a separate chamber because it create more control and reduce processing time.

Respect to claim 79, Veligdan teaches the waveguides (dice having optical device) are stacked to gather to form an optical panel (Fig 2, read on "parallel...are formed").

Respect to claim 83, Xu fails to disclose the panel is selected from the group consisting of quartz, silica, and fused silica. However, Xu clearly discloses the panel is made of polymer material. Veligdan teaches one can either use polymer or glass (aka silica) for the panel (col. 4 lines 52-57). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Xu in view of Veligdan by using silica for the panel because equivalent and substitution of one for the other would produce an expected result. The limitation of claims 80-81, 104-105 has been discussed above.

10. Claim 82 is rejected under 35 U.S.C. 103(a) as being unpatentable over Xu in view of Gessel (US 5,396,351).

Xu fails to disclose the glass panel is a TFT (thin film transistor) panel. Gessel teaches the glass panel is a TFT. It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Xu in view of Gessel by having TFT panel because the TFT exit high quality images with better contrast.

11. Claim 113 is rejected under 35 U.S.C. 103(a) as being unpatentable over Xu in view of Veldhuis et al. (US 6,377,716)

Xu fails to disclose the step of depositing an encapsulation layer over the upper cladding. Veldhuis teaches the to deposit an encapsulating layer (low polymer) over the upper cladding (Fig 1). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Xu in view of Veldhuis by forming encapsulation layer because it will protect the upper cladding

***Response to Arguments***

12. Applicant's arguments filed 9-22-2003 have been fully considered but they are not persuasive.

Respect to claim 71, the applicants argue that Xu describes depositing a lower cladding, a core layer, and an upper cladding on one spin coater. According to the applicants, Xu does not suggest or motivate depositing the lower cladding, core layer, and an upper cladding in different chambers. The examiner disagrees. First, Xu never explicitly disclose that depositing a lower cladding, a core layer, and an upper cladding

on one spin coater. On the contrary, Xu discloses that the core layer is formed by using the reactive ion etching in one of his embodiment (col. 4 line 1-5).

Respect to claim 87, the applicants argue that the examiner "has provided insufficient evidence to support his interpretation that the depositing and curing of the lower cladding of Xu, et al. are performed in the same system". The examiner disagrees with this argument. As discussed above, the examiner interprets the term "system" means a group of interacting, interrelated, or interdependent elements forming a complex whole. The term "system" does not mean a single chamber. The examiner interprets that Xu implicitly teaches the steps of depositing and curing are performed under the group of interacting, interrelated, or interdependent elements forming a complex whole. Therefore, the examiner still maintains that Xu implicitly discloses the above steps are performed in the same processing system.

The applicants further argue that "Xu does not describe depositing a lower cladding in one chamber and depositing a core layer in another chamber or treating a substrate in a densification chamber of the processing system". The examiner disagrees. Xu discloses that the core layer is formed with different material from the lower cladding. Xu further discloses that the core material is etched in a RIE chamber to form a core structure. The examiner still maintains that it is obvious to use different chambers in order to avoid cross contamination. Respect to the limitation regarding to the "densification chamber", the examiner clearly recognizes that Xu does not explicitly use the phrase "densification chamber". However, Xu clearly discloses performing the step of curing by actinic radiation in a chamber. The examiner interprets the step of

curing these layers by actinic radiation in a chamber read on the limitation of "densification chamber".

Respect to claims 106-112, the applicants argue that Xu fails to disclose the step of depositing one or more of a lower cladding, a core layer and an upper cladding and heating one or more of the lower cladding, the core layer and the upper cladding without exposing the layer to atmosphere following the depositing thereof. This argument is not commensurate with the scope of the claim. There is no limitation in the claim that requires no exposing these layers to atmosphere. The examiner interprets the term "in situ" means in the natural or original position. The term "in situ" does not mean without exposing to atmosphere.

***Conclusion***

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X Tran whose telephone number is (703) 308-1867. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G Norton can be reached on (703) 305-2667. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Binh X. Tran

ROBERT KUNEMUND
PRIMARY EXAMINER